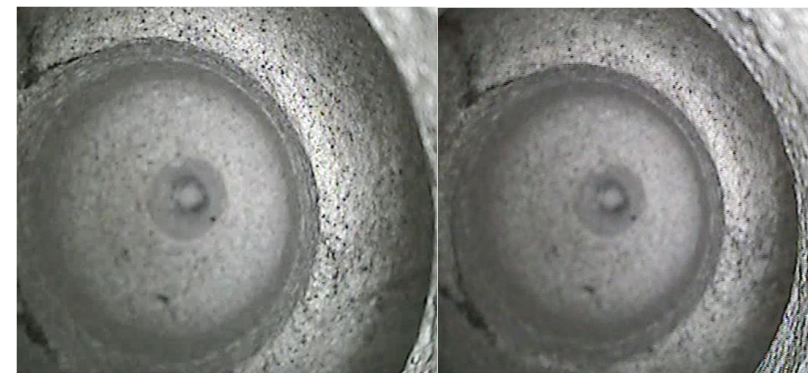
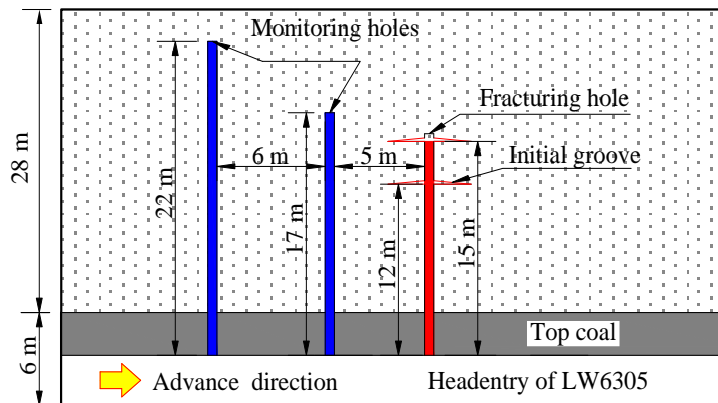
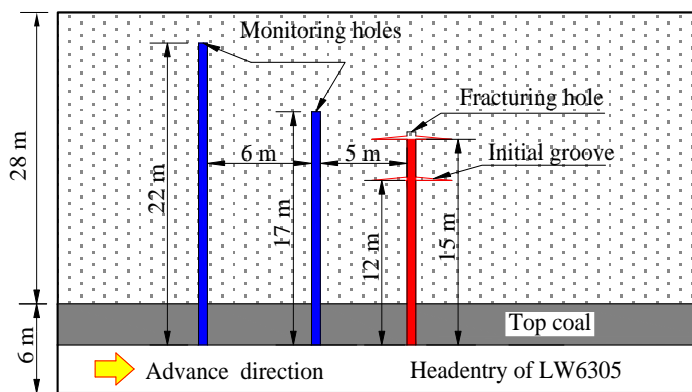
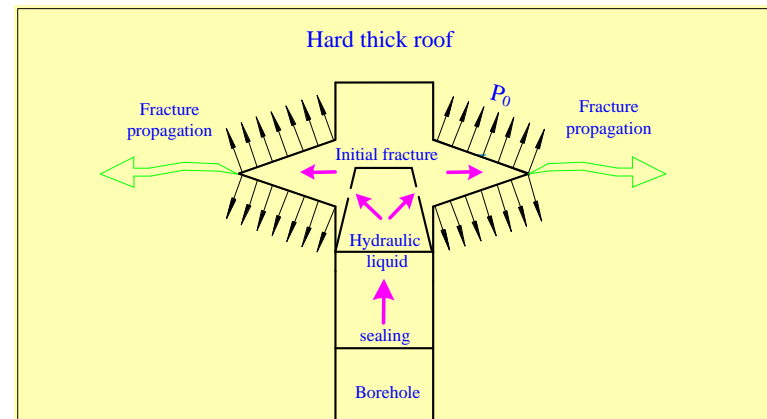


## 顶板高压定向水力致裂技术

- 定向致裂原理
- 高压定向致裂装备
- 高压定向致裂技术



1#切槽窥视图

2#切槽窥视图

# 8.1) 高压定向水力致裂原理

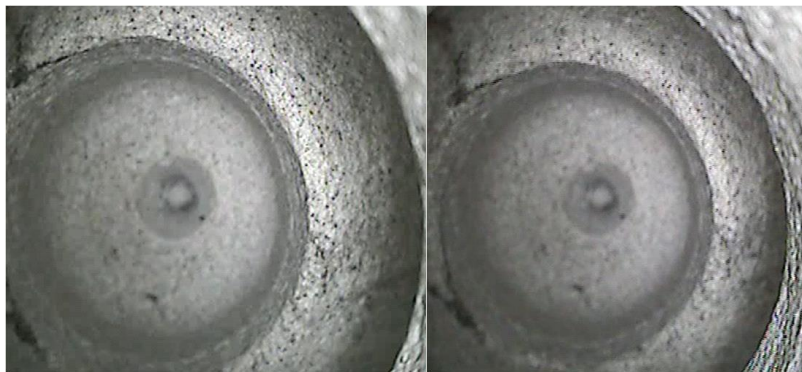
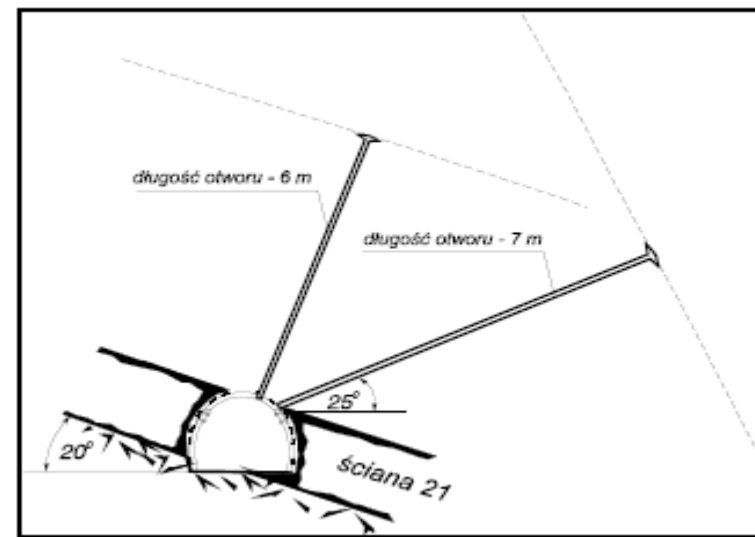
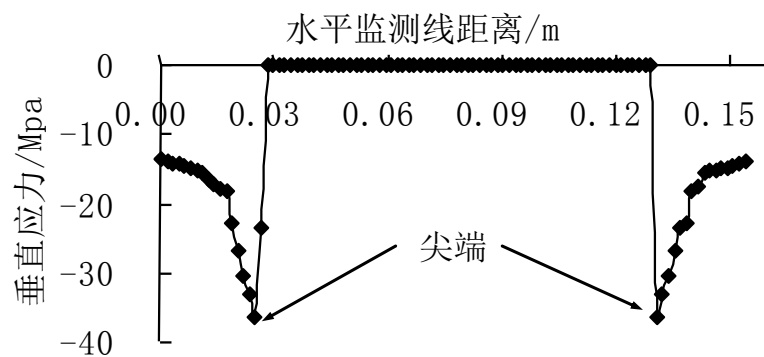
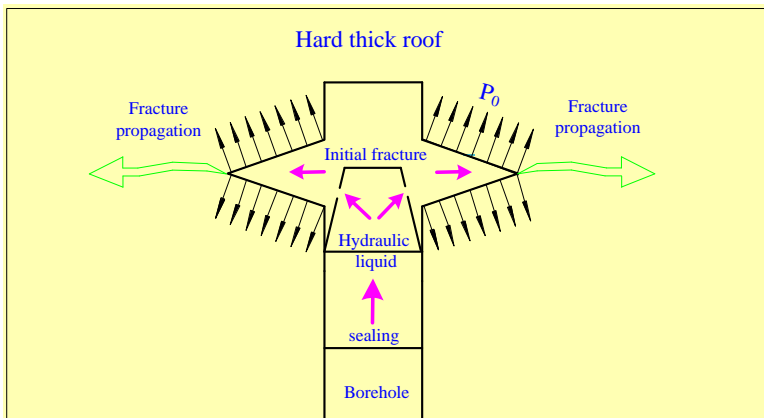


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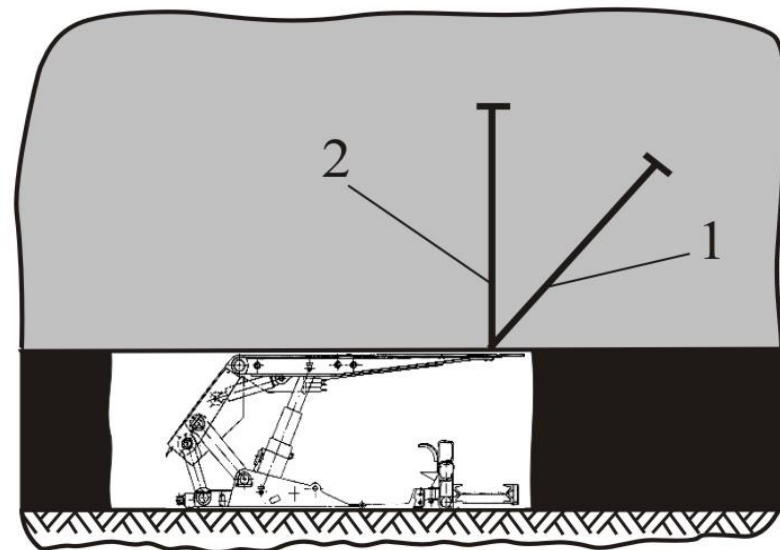
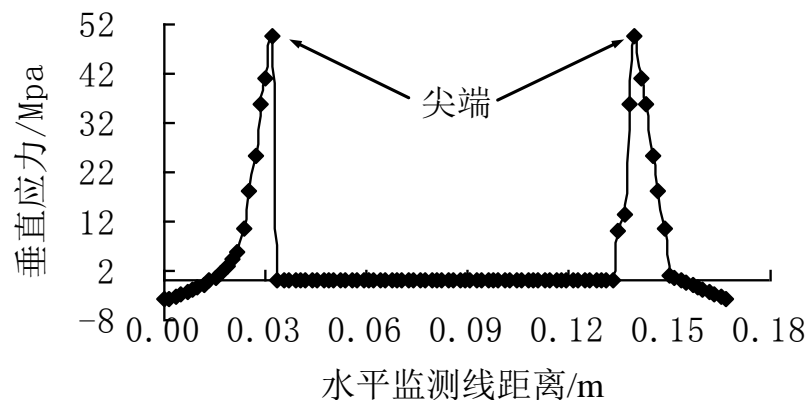
## ➤ 高压水力定向致裂技术 (2006)

$$P = 1.3(P_z^* + R_r)$$



1#切槽窥视图

2#切槽窥视图

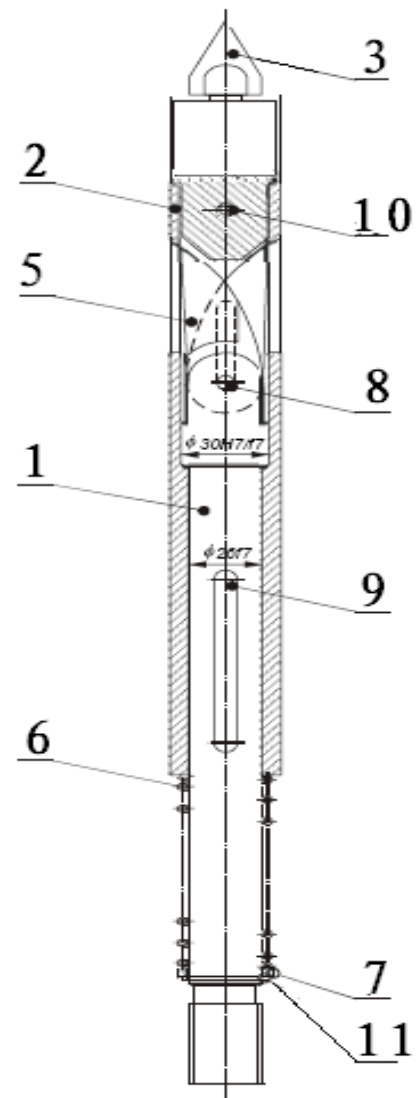


□ 山东省科技进步三等奖 (2013)

## 8.2) 高压定向水力致裂装备



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封孔器



刀具



压力管



钻孔窥视仪

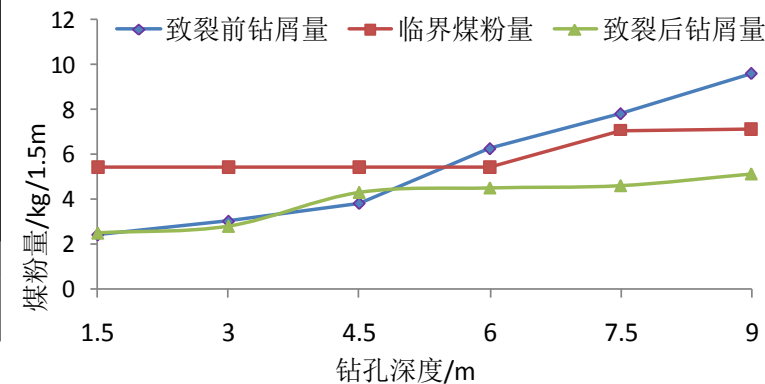
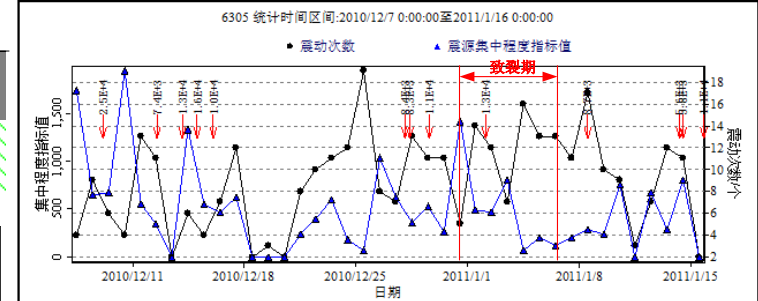
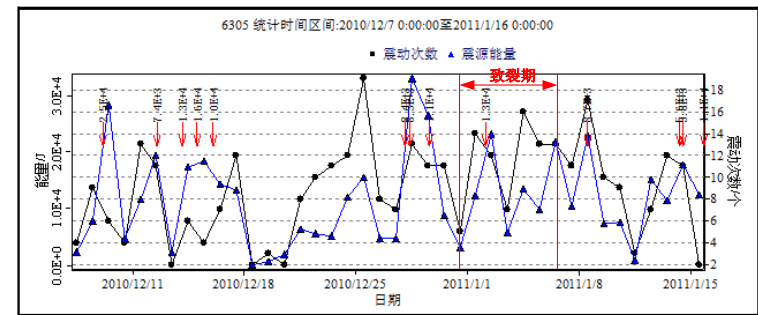
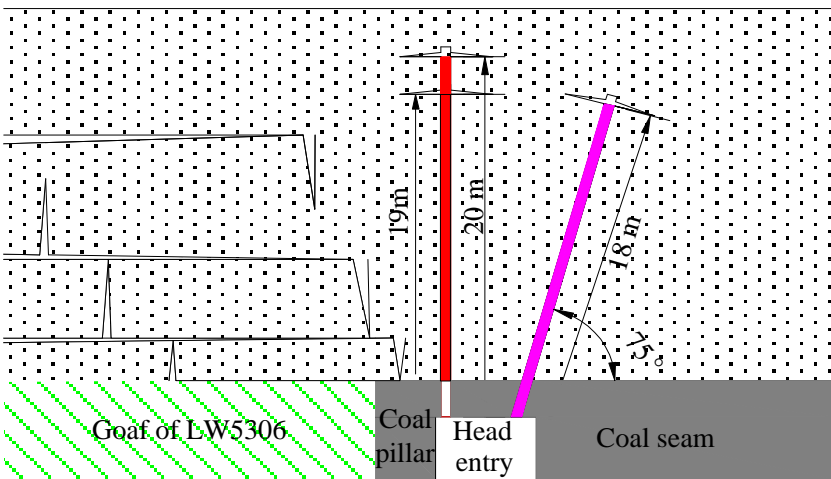
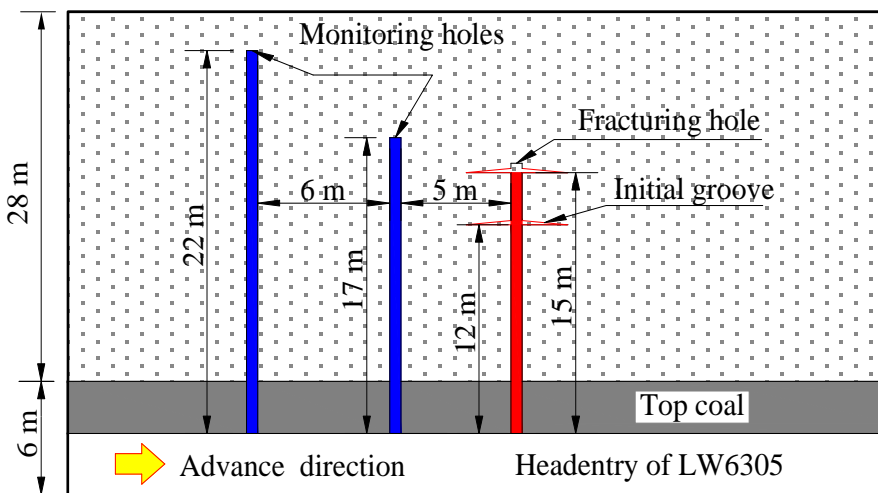
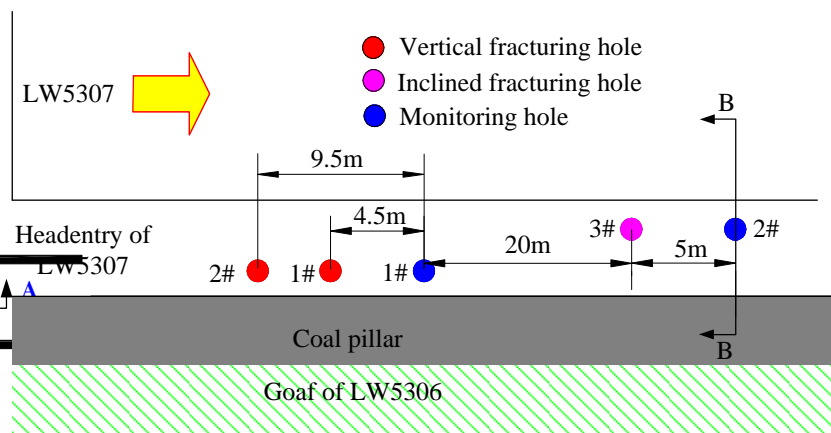
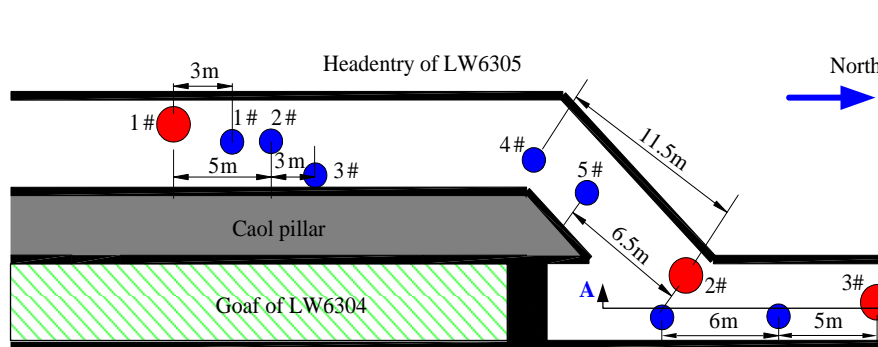
# 8.3) 高压定向水力致裂技术



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## 应用：防冲、强制放顶、护巷



# 8.3) 高压定向水力致裂技术



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## □ 高压定向水力致裂——防冲、护巷

